Who is dying with HIV/AIDS, and how has this changed over time? Detailed Data Tables and Technical Notes

To describe who is dying with HIV/AIDS and how this has changed over time, these tables and the accompanying fact sheet present a profile of deaths during the 7 year period from 1999–2005 among individuals diagnosed with HIV infection and AIDS. Additionally, information about deaths among people reported with AIDS for the ten year period 1996 to 2005, as well as the years 1985, 1990, and 1995 is included for historical perspective. Death data are not available for people reported with HIV infection (non-AIDS) prior to 1999, as HIV infection was not a reportable condition before this time. Lastly, data detailing progression to AIDS after an HIV infection diagnosis are presented to describe trends in morbidity.

Death data presented in this analysis include all deaths among people reported with HIV infection and those with AIDS in Massachusetts. This includes deaths from *non HIV-related* causes, such as cardiovascular disease, cancer and drug or alcohol abuse. Therefore, the number of deaths reported here will vary from the number of *HIV-related* deaths reported in *Massachusetts Deaths* by the Massachusetts Department of Public Health, Center for Health Information, Statistics, Research and Evaluation.

On an annual basis, the HIV/AIDS Surveillance program matches all reports of individuals living with HIV/AIDS against that year's vital statistics file of all individuals who died within Massachusetts. Additionally, death certificates with HIV/AIDS among reported underlying conditions are received by the HIV/AIDS Surveillance Program, and providers may report deaths among their patients.

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS, and how has this changed over time?

Table 1. Ranking of 10 leading causes of death among persons 25–44 years of age: Massachusetts, 2004

Cause	Ranking	N	% of Total Deaths (N=2,247)
Cancer	1	410	18%
Injuries of undetermined intent	2	325	14%
Heart disease	3	285	13%
Unintentional injuries	4	263	12%
Suicide	5	165	7%
HIV/AIDS	6	88	4%
Ill defined conditions	7	85	4%
Homicide	8	60	3%
Chronic liver disease	9	52	2%
Stroke	10	38	2%

Data Source: Center for Health Information, Statistics, Research and Evaluation, Massachusetts Deaths 2004, available online at http://www.mass.gov/Eeohhs2/docs/dph/research_epi/death_report_04.pdf

Table 2. Ranking of non HIV-related causes of death among people reported with HIV/AIDS: Massachusetts, 1999-2002

Cause	Ranking	N	% of non HIV-related deaths (N=283)
Cardiovascular disease	1	60	18%
Cancer	2	42	14%
Drug or alcohol abuse	3	38	13%
Liver disease	4	34	12%
Respiratory disease	5	32	7%
Trauma	6	18	4%
Renal disease	7	15	4%
Neurologic disease	8	9	2%
Diabetes mellitus	9	5	2%
Hematologic, Coagulation Defect, Hemorrhagic	10	4	1%
Metabolic	10	4	1%
Suicide	10	4	1%
Other	11	2	1%
Pancreatic disease	11	2	1%

Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/05

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 3. Deaths among persons reported with HIV infection (non-AIDS) and AIDS by year of death: Massachusetts, 1985–2005[2]

Year of Death	HIV N	AIDS N	Total HIV + AIDS
1985	--[1]	119	--[1]
1990	--[1]	632	--[1]
1995	--[1]	1,184	--[1]
1996	--[1]	795	--[1]
1997	--[1]	386	--[1]
1998	--[1]	332	--[1]
1999	49	349	398
2000	39	335	374
2001	54	369	423
2002	60	317	377
2003	64	327	391
2004	58	272	330
2005[2]	53	247	300

[1] HIV Reporting was implemented in1999, therefore there are no data for deaths among people with HIV who did not progress to AIDS during this time period.
[2] 2005 data are preliminary
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Table 4. Deaths among persons reported with HIV and AIDS by gender, race/ethnicity and exposure mode: Massachusetts, 1999–2005

	HIV		AIDS		Total
Gender:	**N**	**%**	**N**	**%**	**N**
Male	254	67%	1,609	73%	1,863
Female	123	33%	607	27%	730
Race/Ethnicity:	**N**	**%**	**N**	**%**	**N**
White Non-Hispanic	197	52%	1,084	49%	1,281
Black Non-Hispanic	98	26%	581	26%	679
Hispanic	73	19%	531	24%	604
Asian/Pacific Islander	4	1%	12	1%	16
American Indian/Alaska Native	1	<1%	5	<1%	6
Unknown	4	1%	3	<1%	7
Exposure Mode:	**N**	**%**	**N**	**%**	**N**
Male-to-male Sex (MSM)	62	16%	432	19%	494
Injection Drug Use (IDU)	220	58%	1,144	52%	1,364
MSM/IDU	10	3%	110	5%	120
Heterosexual Sex (HTSX)	32	8%	195	9%	227
Other	4	1%	58	3%	62
Total Undetermined	49	13%	277	13%	326
• Presumed HTSX[1]	30	8%	159	7%	189
• Undetermined[2]	19	5%	118	5%	137
Total	**377**	**100%**	**2,216**	**100%**	**2,593**

[1] Heterosexual sex with partner(s) with unknown risk and HIV status
[2] Includes those still being followed up for risk information, those who have died with no determined risk, and those lost to follow-up
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Note: The category of "presumed heterosexual sex" is used in Massachusetts to re-assign people who are reported with no identified risk, but do report heterosexual sex with a partner of unknown HIV status or risk. Massachusetts uses this category to distinguish these cases from other undetermined cases about which we know less. (It should also be noted that, to be classified in the risk category male-to-male sex (MSM), all that is required is one or more sexual contacts with a man since 1977 regardless of that partner(s) infection or risk status.) Nationally, the Centers for Disease Control and Prevention categorizes "presumed heterosexual sex" cases as "no identified risk" (NIR). As such, comparisons of the presumed heterosexual category cannot be made to national data. Caution should be used in interpreting data for presumed heterosexual, as it is still not clear what the exposure risk is for people in this category. Although a person may not report other risk behaviors such as injection drug use or male-to-male sex to his/her health care provider, it does not necessarily mean that he/she has not engaged in these behaviors. There are many barriers to disclosing HIV risk behaviors in the health care setting such as a limited patient-provider relationship or stigma.

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 5. Deaths among persons reported with HIV/AIDS by gender and year of death: Massachusetts, 1999–2005[1]

Year of Death	Male		Female		Total
	N	%	N	%	N
1999	304	76%	94	24%	**398**
2000	271	72%	103	28%	**374**
2001	303	72%	120	28%	**423**
2002	271	72%	106	28%	**377**
2003	262	67%	129	33%	**391**
2004	246	75%	84	25%	**330**
2005[1]	*206*	*69%*	*94*	*31%*	***300***

[1] 2005 data are preliminary
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Table 6. Deaths among persons reported with HIV/AIDS by place of birth and year of death: Massachusetts, 1999–2005[1]

Year of Death	US		Puerto Rico/ US Dependency[2]		Non-US		Total
	N	%	N	%	N	%	N
1999	299	75%	77	19%	22	6%	**398**
2000	286	76%	68	18%	20	5%	**374**
2001	336	79%	52	12%	35	8%	**423**
2002	289	77%	51	14%	37	10%	**377**
2003	309	79%	51	13%	31	8%	**391**
2004	253	77%	50	15%	27	8%	**330**
2005[1]	*228*	*76%*	*49*	*16%*	*23*	*8%*	***300***

[1] 2005 data are preliminary
[2] Ninety-five percent of all people diagnosed with HIV infection in MA who were born in a US dependency were born in Puerto Rico, 1% were born in the US Virgin Islands, <1% were born in American Samoa, and 4% were born in an unspecified dependency
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS, and how has this changed over time?

Table 7. Deaths among persons reported with HIV/AIDS by race/ethnicity and year of death: Massachusetts, 1999–2005[1]

Year of Death	White NH		Black NH		Hispanic		API		AI/AN		Total
	N	%	N	%	N	%	N	%	N	%	N[2]
1999	189	47%	98	25%	106	27%	2	1%	3	1%	**398**
2000	189	51%	88	24%	94	25%	2	1%	1	<1%	**374**
2001	229	54%	116	27%	77	18%	0	0%	1	<1%	**423**
2002	176	47%	113	30%	84	22%	3	1%	0	0%	**377**
2003	189	48%	110	28%	88	23%	2	1%	1	<1%	**391**
2004	166	50%	74	22%	81	25%	5	2%	0	0%	**330**
2005[1]	*143*	*48%*	*80*	*27%*	*74*	*25%*	*2*	*1%*	*0*	*0%*	***300***

[1] 2005 data are preliminary
[2] Totals includes people of unknown race/ethnicity
NH=Non-Hispanic, API=Asian/Pacific Islander, AI/AN=American Indian/Alaska Native
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Table 8. Deaths among *males* reported with HIV/AIDS by race/ethnicity and year of death: Massachusetts, 1999–2005[1]

Year of Death	White NH		Black NH		Hispanic		API		AI/AN		Total
	N	%	N	%	N	%	N	%	N	%	N[2]
1999	152	50%	73	24%	75	25%	2	1%	2	1%	**304**
2000	149	55%	54	20%	65	24%	2	1%	1	<1%	**271**
2001	168	55%	77	25%	57	19%	0	0%	1	<1%	**303**
2002	137	51%	73	27%	57	21%	3	1%	0	0%	**271**
2003	126	48%	66	25%	66	25%	2	1%	1	<1%	**262**
2004	133	54%	52	21%	54	22%	5	2%	0	0%	**246**
2005[1]	*102*	*50%*	*48*	*23%*	*54*	*26%*	*2*	*1%*	*0*	*0%*	***206***

[1] 2005 data are preliminary
[2] Totals includes people of unknown race/ethnicity
NH=Non-Hispanic, API=Asian/Pacific Islander, AI/AN=American Indian/Alaska Native
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 9. Deaths among *females* reported with HIV/AIDS by race/ethnicity and year of death: Massachusetts, 1999–2005[1]

Year of Death	White NH		Black NH		Hispanic		API		AI/AN		Total
	N	%	N	%	N	%	N	%	N	%	N[2]
1999	37	39%	25	27%	31	33%	0	0%	1	1%	**94**
2000	40	39%	34	33%	29	28%	0	0%	0	0%	**103**
2001	61	51%	39	33%	20	17%	0	0%	0	0%	**120**
2002	39	37%	40	38%	27	25%	0	0%	0	0%	**106**
2003	63	49%	44	34%	22	17%	0	0%	0	0%	**129**
2004	33	39%	22	26%	27	32%	0	0%	0	0%	**84**
2005[1]	*41*	*44%*	*32*	*34%*	*20*	*21%*	*0*	*0%*	*0*	*0%*	***94***

[1] 2005 data are preliminary
[2] Totals includes people of unknown race/ethnicity
NH=Non-Hispanic, API=Asian/Pacific Islander, AI/AN=American Indian/Alaska Native
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Table 10. Deaths among persons reported with HIV/AIDS by exposure mode and year of death: Massachusetts, 1999–2005[1]

	MSM		IDU		MSM/ IDU		HTSX		Other		Pres. HTSX[2]		Undeter -mined[3]		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
1999	72	18%	214	54%	18	5%	33	8%	14	4%	30	8%	17	4%	**398**
2000	76	20%	203	54%	16	4%	25	7%	13	3%	27	7%	14	4%	**374**
2001	91	22%	218	52%	20	5%	29	7%	7	2%	29	7%	29	7%	**423**
2002	77	20%	202	54%	17	5%	36	10%	9	2%	24	6%	12	3%	**377**
2003	73	19%	197	50%	17	4%	46	12%	8	2%	28	7%	22	6%	**391**
2004	61	18%	167	51%	19	6%	26	8%	8	2%	26	8%	23	7%	**330**
2005[1]	*44*	*15%*	*163*	*54%*	*13*	*4%*	*32*	*11%*	*3*	*1%*	*25*	*8%*	*20*	*7%*	***300***

[1] 2005 data are preliminary
[2] Heterosexual sex with partner(s) with unknown risk and HIV status
[3] Includes those still being followed up for risk information, those who have died with no determined risk, and those lost to follow-up
MSM = Male-to-Male Sex; IDU = Injection Drug Use; MSM/IDU = Male-to-Male Sex and Injection Drug Use; HTSX = Heterosexual Sex; Pres. HTSX = Presumed Heterosexual Sex
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS, and how has this changed over time?

Table 11. Deaths among *males* reported with HIV/AIDS by exposure mode and year of death: Massachusetts, 1999–2005[1]

	MSM		IDU		MSM/ IDU		HTSX		Other		Pres. HTSX[2]		Undeter -mined[3]		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
1999	72	24%	160	53%	18	6%	10	3%	11	4%	17	6%	16	5%	**304**
2000	76	28%	135	50%	16	6%	4	1%	10	4%	16	6%	14	5%	**271**
2001	91	30%	137	45%	20	7%	12	4%	2	1%	15	5%	26	9%	**303**
2002	77	28%	134	49%	17	6%	10	4%	6	2%	16	6%	11	4%	**271**
2003	73	28%	124	47%	17	6%	17	6%	4	2%	19	7%	8	3%	**262**
2004	61	25%	114	46%	19	8%	13	5%	7	3%	14	6%	18	7%	**246**
2005[1]	*44*	*21%*	*110*	*53%*	*13*	*6%*	*11*	*5%*	*2*	*1%*	*12*	*6%*	*14*	*7%*	***206***

[1] 2005 data are preliminary
[2] Heterosexual sex with partner(s) with unknown risk and HIV status
[3] Includes those still being followed up for risk information, those who have died with no determined risk, and those lost to follow-up
MSM = Male-to-Male Sex; IDU = Injection Drug Use; MSM/IDU = Male-to-Male Sex and Injection Drug Use; HTSX = Heterosexual Sex; Pres. HTSX = Presumed Heterosexual Sex
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Table 12. Deaths among *females* reported with HIV/AIDS by exposure mode and year of death: Massachusetts, 1999–2005[1]

	IDU		HTSX		Other		Pres. HTSX[2]		Undeter- mined[3]		Total
	N	%	N	%	N	%	N	%	N	%	N
1999	54	57%	23	24%	3	3%	13	14%	1	1%	**94**
2000	68	66%	21	20%	3	3%	11	11%	0	0%	**103**
2001	81	68%	17	14%	5	4%	14	12%	3	3%	**120**
2002	68	64%	26	25%	3	3%	8	8%	1	1%	**106**
2003	73	57%	29	22%	4	3%	9	7%	14	11%	**129**
2004	53	63%	13	15%	1	1%	12	14%	5	6%	**84**
2005[1]	*53*	*56%*	*21*	*22%*	*1*	*1%*	*13*	*14%*	*6*	*6%*	***94***

[1] 2005 data are preliminary
[2] Heterosexual sex with partners with unknown risk and HIV status
[3] Includes those still being followed up for risk information, those who have died with no determined risk, and those lost to follow-up
IDU = Injection Drug Use; HTSX = Heterosexual Sex; Pres. HTSX = Presumed Heterosexual Sex
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding), data as of 7/1/06

Technical Notes: Explanation of Crude and Age-Adjusted Rates of Death

A rate of a disease per 100,000 population is a more precise way to compare groups that have substantially different population sizes rather than relying on the raw number of deaths. To adjust for fluctuations in the annual rate of death among people reported with HIV/AIDS, an average annual rate of death for the period 2003 to 2005 is used. The average number of deaths is calculated over the three-year period by adding the total number of deaths among people reported with HIV/AIDS in each of the three years and dividing by three. The crude average annual rate of death is then calculated by dividing the average number of people reported with HIV/AIDS who died during the three years by the entire population (everyone or the sub-population involved) and multiplying by 100,000. (See example 1 below). The Massachusetts Department of Public Health (DPH) Race-Allocated Census 2000 Estimates (MRACE) file is the source of population sizes for these calculations.

Example 1: Calculation of Crude Average Annual Rate of Death among People Reported with HIV/AIDS for White Individuals, Massachusetts, 2003–2005 (3.1 per 100,000)

Crude average annual rate of death among reported HIV/AIDS cases for white individuals, 2003–2005

= (((number of white individuals reported with HIV/AIDS who died in 2003 + number of white individuals reported with HIV/AIDS who died in 2004 + number of white individuals reported with HIV/AIDS who died in 2005) ÷ 3) ÷ population size of white individuals) × 100,000
= (((189 + 166 + 143) ÷ 3) ÷ 5,326,585) × 100,000
= ((498 ÷ 3) ÷ 5,326,585) × 100,000
= (166 ÷ 5,326,585) × 100,000
= 0.0000312 × 100,000
= **3.1**

Sometimes, in addition to the population size being different, the age composition of the populations is different. In Massachusetts, black and Hispanic populations are younger than white. The median age of black people (29.7 years) and Hispanic people (24.5 years) is younger than that of white people (38.8 years). Therefore, it is necessary to "age-adjust" the rate of death among people reported with HIV/AIDS to get a true comparison of the impact of the disease across racial/ethnic groups without an effect from the differences in age composition. Age-adjustment of rates minimizes the distortion created by differences in age composition.

Age-adjusted rates are calculated by weighting the age-specific rates for a given population by the age distribution of a standard population. The age-specific rates are calculated for eleven age groups ranging from less than one year old to 85 years or above and are weighted by the 2000 US standard population. The weighted age-

specific rates are then added to produce the adjusted rate for all ages combined. (See example 2 below).

Example 2: Calculation of Age-adjusted Rate of Death among People Reported with HIV/AIDS for White Individuals, Massachusetts, 2003–2005, (2.9 per 100,000)

A	B	C	D	E
Age group (in years)	*Average number of deaths among reported HIV/AIDS cases 2003–2005*	*Population (2000)*	*2000 US standard population weight*	*Age-adjusted rate ((B÷C×D)×100,000))*
<1	0.000000	61,381	0.013818	0.000000
1-4	0.000000	245,562	0.055317	0.000000
5-14	0.000000	675,388	0.145565	0.000000
15-24	1	634,387	0.138646	0.0218551
25-34	3.33333333	734,417	0.135573	0.0615332
35-44	45.3333333	902,498	0.162613	0.8168206
45-54	78	771,970	0.134834	1.3623654
55-64	31.6666667	491,985	0.087247	0.5615662
65-74	5.66666667	396,458	0.066037	0.0943882
75-84	0.33333333	300,442	0.044842	0.0049751
85+ years	0.66666667	112,097	0.015508	0.009223
Total	166	5,326,585	1	**2.9**

To see the effect of age-distribution on rates of death see Table 8 below for a comparison of crude and age-adjusted rates by race/ethnicity.

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 13. Crude and age-adjusted rates of death among people reported with HIV/AIDS per 100,000 population by race/ethnicity and gender: average annual rate 2003–2005, Massachusetts		
State Total:	**Crude Rate per 100,000**	**Age-Adjusted Rate per 100,000**
White (non-Hispanic)	3.1	2.9
Black (non-Hispanic)	26.1	31.0
Hispanic	18.9	29.2
Asian/Pacific Islander	1.2	1.4
American Indian/Alaskan Native	2.9	2.7
MA Total Rate	**5.4**	**5.3**
Males:	**Crude Rate per 100,000**	**Age-Adjusted Rate per 100,000**
White (non-Hispanic) Males	4.7	4.4
Black (non-Hispanic) Males	34.1	42.2
Hispanic Males	27.4	46.7
Asian/Pacific Islander Males	2.5	2.8
American Indian/Alaskan Native Males	5.8	5.5
MA Total Rate Among Males	**7.8**	**7.6**
Females:	**Crude Rate per 100,000**	**Age-Adjusted Rate per 100,000**
White (non-Hispanic) Females	1.6	1.6
Black (non-Hispanic) Females	18.7	21.3
Hispanic Females	10.6	14.4
Asian/Pacific Islander Females	0.0	0.0
American Indian/Alaskan Native Females	0.0	0.0
MA Total Rate Among Females	**3.1**	**3.1**

[1] The denominators for rate calculations are based on year 2000 population estimates from the MDPH Center for Health Information, Statistics, Research and Evaluation, all rates are age-adjusted using the 2000 US standard population
Data Source: MDPH HIV/AIDS Surveillance Program; data as of 7/1/06

Technical Notes: Explanation of Case Fatality Rate

The case fatality rate reflects the severity of a disease. For HIV/AIDS, it represents the proportion of people reported with HIV/AIDS who died in a specific time period and is usually expressed as a percentage. To adjust for fluctuations in the number of annual deaths among people reported with HIV/AIDS, an average annual case fatality rate for the period 2003 to 2005 is used. The average number of deaths is calculated over the three-year period by adding the total number of deaths among people reported with HIV/AIDS in each of the three years and dividing by three. The average number of people living with HIV/AIDS is calculated by adding the number of people living with HIV/AIDS on January 1st of each year to the number of people newly diagnosed with HIV infection in that year for each of the three years and dividing by three. The average annual case fatality rate is then calculated by dividing the average number of people reported with HIV/AIDS who died during the three years by the average number of people living with HIV/AIDS. (See example 1 below).

Example 1: Calculation of Average Annual HIV/AIDS Case Fatality Rate for White Individuals, Massachusetts, 2003─2005, (2.3%)

Average annual HIV/AIDS case fatality rate for white individuals, 2003–2005	= (((number of white individuals reported with HIV/AIDS who died in 2003 + number of white individuals reported with HIV/AIDS who died in 2004 + number of white individuals reported with HIV/AIDS who died in 2005) ÷ 3) ÷ ((number of white individuals living with HIV/AIDS on 1/1/2003 + number of white individuals reported with HIV diagnosis in 2003 + number of white individuals living with HIV/AIDS on 1/1/2004 + number of white individuals reported with HIV diagnosis in 2004 + number of white individuals living with HIV/AIDS on 1/1/2005 + number of white individuals reported with HIV diagnosis in 2005) ÷ 3)) = (((189 + 166 + 143) ÷ 3) ÷ ((6,695 + 366 + 6,872 + 360 + 7,066 + 322) ÷ 3)) = ((498 ÷ 3) ÷ (21,681 ÷ 3)) = 166 ÷ 7,227 = 0.022969 = **2.3%**

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 14. HIV/AIDS case fatality rate[1] by exposure mode: average annual rate 2003–2005, Massachusetts

State Total:	Case Fatality Rate[1]
Male-to-male Sex	1.2%
Injection Drug Use	3.9%
Male-to-male Sex/Injection Drug Use	3.1%
Heterosexual Sex	1.6%
Other	1.5%
Presumed Heterosexual Sex[2]	1.2%
Undetermined[3]	2.6%
MA Total Rate	**2.2%**

[1] Case fatality rate = (number of people who died with HIV/AIDS in year) ÷ (number of people living with HIV/AIDS on 1/1 of year + number of people diagnosed with HIV infection during that year)
[2] Heterosexual sex with partner(s) with unknown risk and HIV status
[3] Includes those still being followed up for risk information, those who have died with no determined risk, and those lost to follow-up
Data Source: MDPH HIV/AIDS Surveillance Program, data as of 7/1/06

Table 15. HIV/AIDS case fatality rate[1] by place of birth: average annual rate 2003–2005, Massachusetts

State Total:	Case Fatality Rate[1]
United States	2.4%
Puerto Rico/Other US Dependency[2]	2.5%
Non-US	1.0%
MA Total Rate	**2.2%**

[1] Case fatality rate = (number of people who died with HIV/AIDS in year) ÷ (number of people living with HIV/AIDS on 1/1 of year + number of people diagnosed with HIV infection during that year)
[2] Ninety-five percent of all people diagnosed with HIV infection in MA who were born in a US dependency were born in Puerto Rico, 1% were born in the US Virgin Islands, <1% were born in American Samoa, and 4% were born in an unspecified dependency
Data Source: MDPH HIV/AIDS Surveillance Program, data as of 7/1/06

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS, and how has this changed over time?

Table 16. HIV/AIDS case fatality rate[1] by race/ethnicity[2] and gender: average annual rate 2003–2005, Massachusetts	
State Total:	Case Fatality Rate[1]
White (non-Hispanic)	2.3%
Black (non-Hispanic)	2.0%
Hispanic	2.1%
MA Total Rate	**2.2%**
Males:	Case Fatality Rate[1]
White (non-Hispanic) Males	2.1%
Black (non-Hispanic) Males	2.2%
Hispanic Males	2.2%
MA Total Rate Among Males	**2.1%**
Females:	Case Fatality Rate[1]
White (non-Hispanic) Females	3.3%
Black (non-Hispanic) Females	1.8%
Hispanic Females	1.8%
MA Total Rate Among Females	**2.2%**

[1] Case fatality rate = (number of people who died with HIV/AIDS in year) ÷ (number of people living with HIV/AIDS on 1/1 of year + number of people diagnosed with HIV infection during that year)
[2] Rates for Asian/Pacific Islanders and American Indian/Alaska Natives are not presented due to small numbers
Data Source: MDPH HIV/AIDS Surveillance Program; data as of 7/1/06

Technical Notes: Trends in survival after an AIDS diagnosis

The following analyses describe changes over time in the survival of people who are diagnosed with AIDS in Massachusetts.

Tables 11-13 describe how many people died within 1 year of an AIDS diagnosis, between 1 and 2 years, between 2 and 3 years, etc., and up to 10 or more years for all people diagnosed with AIDS from 1987 to 2002. For example, the first column of Table 11 indicates that of 651 people diagnosed with AIDS in 1987, 265, or 41%, died within 1 year of diagnosis; 159, or 24%, died between 1 and 2 years of diagnosis; and 94, or 14%, died between 2 and 3 years of diagnosis.

It should be noted that if a person was diagnosed with AIDS in 2003, only one complete year of survival can be assessed, since this report includes data only up to July 1, 2005. Likewise, a diagnosis of AIDS in 2002 would not allow observation for more than two years, etc. These observations are relevant when interpreting the following tables and especially when comparing the distribution of survival times across years. With these caveats in mind, there has been a fairly consistent decline in the percentage of people who die within two years of an AIDS diagnosis. This most likely reflects higher rates of early diagnosis and improved care and treatment of people living with AIDS in the Commonwealth.

In comparing survival for people diagnosed in 1988 with people diagnosed in more recent years, it is evident that the proportion of people who are still alive is greater for each successive time period. More people are surviving for longer time periods after being diagnosed with AIDS. The increase in survival time could mean that people truly are living longer, or it could be a result of changes in reporting. Regarding the latter, the AIDS case definition was expanded in 1993 to include people with a CD4 count below 200. This change in the case definition would mean that as of 1993, more people are counted as having an AIDS diagnosis although they are not as sick as those diagnosed with AIDS in earlier years, leading to longer survival. At the same time, significant advances in treatment over the years certainly account for a significant increase in survival. The increases in survival in the late 80s and early 90s are due in part to the introduction of *Pneumocystis carinii* pneumonia (PCP) prophylaxis, and the movement towards earlier diagnosis and initiation of antiretroviral treatment. Increases in survival in the mid 90's are explained mostly by highly effective antiretroviral therapy.

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS, and how has this changed over time?

Table 17. Time from AIDS diagnosis to death by year of AIDS diagnosis: Massachusetts, 1987–1991

Survival time[1]	1987		1988		1989		1990		1991	
	N	%	N	%	N	%	N	%	N	%
<1 yr.	265	41%	277	32%	285	29%	290	27%	362	27%
1 - <2 yr.	159	24%	208	24%	229	23%	215	20%	308	23%
2 - <3 yr.	94	14%	136	16%	164	16%	193	18%	200	15%
3 - <4 yr.	43	7%	70	8%	89	9%	116	11%	119	9%
4 - <5 yr.	18	3%	34	4%	63	6%	60	6%	68	5%
5 - <6 yr.	9	1%	24	3%	46	5%	39	4%	35	3%
6 - <7 yr.	7	1%	13	2%	17	2%	14	1%	13	1%
7 - <8 yr.	5	1%	11	1%	6	1%	10	1%	13	1%
8 - <9 yr.	9	1%	3	0%	6	1%	11	1%	9	1%
9 - <10 yr.	0	0%	2	0%	4	0%	6	1%	7	1%
10+ yr.	9	1%	15	2%	16	2%	16	1%	23	2%
Still Alive	29	4%	66	8%	73	7%	109	10%	171	13%
Total[2]	649	100%	860	100%	998	100%	1,079	100%	1,330	100%

[1] Years between AIDS diagnosis and death
[2] Totals include 8 individuals diagnosed with AIDS between 1987 and 2003 where the years between AIDS diagnosis and death is unknown; Data Source: MDPH Surveillance Program; data as of 7/1/06

Table 18. Time from AIDS diagnosis to death by year of AIDS diagnosis: Massachusetts, 1992–1997

Survival time[1]	1992		1993		1994		1995		1996		1997	
	N	%	N	%	N	%	N	%	N	%	N	%
<1 yr.	371	21%	350	20%	300	20%	216	15%	109	9%	70	8%
1 - <2 yr.	378	22%	357	20%	254	17%	105	8%	45	4%	39	4%
2 - <3 yr.	304	17%	257	15%	117	8%	58	4%	52	4%	35	4%
3 - <4 yr.	170	10%	110	6%	53	4%	52	4%	48	4%	35	4%
4 - <5 yr.	55	3%	50	3%	37	3%	42	3%	41	4%	35	4%
5 - <6 yr.	32	2%	35	2%	44	3%	35	3%	37	3%	22	2%
6 - <7 yr.	37	2%	32	2%	27	2%	37	3%	36	3%	23	3%
7 - <8 yr.	15	1%	34	2%	44	3%	47	3%	23	2%	21	2%
8 - <9 yr.	32	2%	20	1%	24	2%	25	2%	22	2%	17	2%
9 - <10 yr.	20	1%	24	1%	15	1%	20	1%	7	1%	--[2]	--[2]
10+ yr.	44	3%	39	2%	32	2%	9	1%	--[2]	--[2]	--[2]	--[2]
Still Alive	284	16%	447	25%	527	36%	752	54%	738	64%	619	68%
Total[3]	1,743	100%	1,756	100%	1,474	100%	1,398	100%	1,159	100%	916	100%

[1] Years between AIDS diagnosis and death
[2] Individuals diagnosed in this year have not yet had the opportunity to survive this many years before death
[3] Totals include 8 individuals diagnosed with AIDS between 1987 and 2003 where the years between AIDS diagnosis and death is unknown; Data Source: MDPH Surveillance Program; data as of 7/1/06

Detailed Data Tables and Technical Notes: Who is dying with HIV/AIDS and how has this changed over time?

Table 19. Time from AIDS diagnosis to death by year of AIDS diagnosis: Massachusetts, 1998–2003

Survival time[1]	1998		1999		2000		2001		2002		2003	
	N	%	N	%	N	%	N	%	N	%	N	%
<1 yr.	58	6%	66	7%	59	8%	65	9%	44	7%	37	7%
1 - <2 yr.	41	4%	32	3%	20	3%	23	3%	18	3%	16	3%
2 - <3 yr.	19	2%	39	4%	26	3%	21	3%	15	2%	4	1%
3 - <4 yr.	24	2%	23	2%	19	2%	14	2%	5	1%	--[2]	--[2]
4 - <5 yr.	27	3%	25	3%	23	3%	6	1%	--[2]	--[2]	--[2]	--[2]
5 - <6 yr.	27	3%	20	2%	16	2%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
6 - <7 yr.	19	2%	11	1%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
7 - <8 yr.	11	1%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
8 - <9 yr.	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
9 - <10 yr.	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
10+ yr.	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
Still Alive	737	77%	712	77%	614	79%	569	82%	577	88%	500	90%
Total[3]	**963**	**100%**	**928**	**100%**	**777**	**100%**	**698**	**100%**	**659**	**100%**	**557**	**100%**

[1] Years between AIDS diagnosis and death
[2] Individuals diagnosed in this year have not yet had the opportunity to survive this many years before death
[3] Totals include 8 individuals diagnosed with AIDS between 1987 and 2003 where the years between AIDS diagnosis and death is unknown; Data Source: MDPH Surveillance Program; data as of 7/1/06

Technical Notes: Trends in morbidity - progression to AIDS after HIV infection diagnosis

The following analyses describe progression to an AIDS diagnosis among people who are diagnosed with HIV infection in Massachusetts.

Table 4 describes, for all people diagnosed with HIV infection from 1999 to 2004, how many people progressed to AIDS within 2 months of HIV infection diagnosis; how many between 1 and 2 years following diagnosis, between 2 and 3 years, etc.; and how many have not been diagnosed with AIDS.

Table 20. Time from HIV infection diagnosis to AIDS diagnosis by year of HIV infection diagnosis: Massachusetts, 1999–2004												
Year of HIV infection	**1999**		**2000**		**2001**		**2002**		**2003**		**2004**	
HIV to AIDS[1]	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
<2 mo.	346	26%	310	27%	294	29%	289	27%	255	27%	264	28%
2 mo. - <1 yr.	172	13%	136	12%	108	11%	108	10%	82	9%	91	10%
1 - <2 yr.	58	4%	37	3%	47	5%	38	4%	36	4%	34	4%
2 - <3 yr.	33	2%	21	2%	17	2%	27	3%	25	3%	4	<1%
3 - <4 yr.	28	2%	24	2%	18	2%	19	2%	4	<1%	--[2]	--[2]
4 - <5	12	1%	17	1%	11	1%	4	<1%	--[2]	--[2]	--[2]	--[2]
5 - <6	16	1%	13	1%	4	<1%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
6 - <7	19	1%	1	<1%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
7 - <8	2	<1%	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
HIV DX only[3]	639	48%	605	52%	504	50%	579	54%	531	57%	550	58%
Total	**1325**		**1164**		**1003**		**1064**		**933**		**943**	

[1] Time from HIV infection diagnosis to AIDS diagnosis
[2] Individuals diagnosed with HIV infection in this year have not yet had the opportunity to be living with HIV infection for this many years before progressing to AIDS
[2] HIV infection diagnosis only; individuals have not yet progressed to AIDS
Data Source: MDPH Surveillance Program; data as of 7/1/06